

REMARKS

By this Amendment, claims 1, 3, 20 and 22 are amended merely for clarity, and no new matter is presented. Claims 1-3, 9, 11-17, 20-23, 30 and 32-38 are pending.

Reconsideration and allowance of the present application based on the above amendments and the following remarks is respectfully requested.

Claims 1-3, 9, 11-14, 20-23, 30 and 32 were rejected under 35 U.S.C. § 103(a) over Kaumle et al., U.S. Patent No. 6,068,890, in view of Schwing et al., U.S. Patent No. 5,656,335. Applicants traverse the rejection because the combined teaching of Kaumle et al. and Schwing et al. fails to disclose or suggest all the features recited in the rejected claims.

For example, the combined teaching of Kaumle et al. and Schwing et al. fails to disclose or suggest a surface structure including a thin metal film made from a titanium-aluminum alloy containing 20-50% by weight of titanium and 80-50% by weight of aluminum, the thin metal film having a homogenous composition throughout a whole thickness of the thin metal film and having a color similar to pure chrome, as recited in independent claims 1 and 3. Similarly, the combined teaching of Kaumle et al. and Schwing et al. fails to disclose or suggest a method for manufacturing a surface structure including forming a thin metal film having a homogenous composition throughout a whole thickness of the thin metal film and having a color similar to pure chrome, made from a titanium-aluminum alloy containing 20-50% by weight of titanium and 80-50% by weight of aluminum using a single sintered target containing 20%-50% by weight of titanium and 80%-50% by weight of aluminum in a nitrogen-free vacuum atmosphere, as recited in independent claims 20 and 22.

To the contrary, Kaumle et al. merely discloses a metallic gloss layer formed by magnetron atomization in which aluminum is used as one target and titanium is used as the other target in a nitrogen atmosphere to produce colors (column 4, lines 58-61). During the atomization step the gloss layer is formed by pulsed magnetron sputtering in which two targets, including one target made of aluminum and the other target made of titanium, are alternately utilized. As a result, the aluminum layer and the titanium layer are alternately formed one above the other in the thickness direction of the layers, and thus a homogenous thin metal layer throughout its whole thickness, as recited in claims 1, 3, 20 and 22, cannot be obtained.

Furthermore, the Kuamle et al. magnetron atomization is conducted in a reactive nitrogen atmosphere. Since nitrogen is introduced during the magnetron atomization, and

nitrogen reacts with titanium to form titanium nitride (TiN), a violet color (column 5, line 8) will be produced, but Applicants submit that a color similar to pure chrome, as recited in claims 1, 3, 20 and 22, cannot be produced in Kuamle et al.

The Office Action acknowledges in paragraph 7 that Kuamle et al. does not specifically teach any compositions of the metal alloys utilized. Although the Office Action alleges that the color of the Kuamle et al. thin metal film is controlled by the composition of the thin metal film, Applicants submit that the color obtained by the method of Kuamle et al. is likely to vary between the aluminum color and the titanium color, and due to the reactive nitrogen gas, the color tone and reflectivity of the layer are not kept constant over the entire area and may be varied in places, so that color control would be very difficult. Accordingly Kuamle et al. does not disclose a thin metal film having a homogenous composition throughout a whole thickness of the thin metal film and having a color similar to pure chrome, as recited in the independent claims.

Schwing et al. fails to remedy the deficiencies of Kuamle et al. Schwing et al. is merely directed to coating a substrate with a metal giving a polished effect. Schwing et al. discloses that a metal such as aluminum, chromium, titanium, silver, or gold is vaporized in a plasma in order to coat the substrate (column 3, lines 10-12), but fails to disclose or suggest a metal film made from a titanium-aluminum alloy with specific ranges of weight % of titanium and aluminum or having a homogenous composition throughout a whole thickness of the thin metal film and having a color similar to pure chrome.

Therefore, the combined teaching of Kuamle et al. and Schwing et al. does not disclose or suggest the claimed surface structure and method for manufacturing a surface structure including a thin metal film made from a titanium-aluminum alloy containing 20-50% by weight of titanium and 80-50% by weight of aluminum, said metal film having a homogenous composition throughout a whole thickness of said thin metal film and having a color similar to pure chrome, as recited in independent claims 1, 3, 20 and 22. Furthermore, the combined teaching of Kuamle et al. and Schwing et al. does not disclose using a single sintered target containing 20%-50% by weight of titanium and 80%-50% by weight of aluminum in a nitrogen-free vacuum atmosphere, as recited in independent claims 20 and 22. Thus, Applicants submit that the §103 rejection of independent claims 1, 3, 20 and 22 and their dependent claims 2, 9, 11-14, 21, 23, 30 and 32 is overcome.

Claims 15 and 36 were rejected under 35 U.S.C. § 103(a) over Kuamle et al. further in view of Tsuge et al., U.S. Patent No. 5,227,451. Applicants traverse the rejection because the

combined teaching of Kuamle et al. and Tsuge et al. fails to disclose or suggest all of the features recited in the claims.

Claims 15 and 36 depend from independent claims 3 and 22, respectively. As explained above with respect to independent claims 3 and 22, Kuamle et al. fails to disclose or suggest a thin metal film or method of manufacturing a thin metal film made from a titanium-aluminum alloy containing 20-50% by weight of titanium and 80-50% by weight of aluminum, the thin metal film having a homogenous composition throughout a whole thickness of the thin metal film and having a color similar to pure chrome. Tsuge et al. fails to remedy the deficiencies of Kuamle et al. because Tsuge et al. is merely directed to a urethane prepolymer and polyurethane compositions comprising the prepolymer, and Tsuge et al. is not directed to metal alloys.

Therefore, Applicants submit that the combined teaching of Kuamle et al. and Tsuge et al. fails to disclose or suggest a thin metal film or method of manufacturing a thin metal film made from a titanium-aluminum alloy containing 20-50% by weight of titanium and 80-50% by weight of aluminum, the thin metal film having a homogenous composition throughout a whole thickness of the thin metal film and having a color similar to pure chrome, as recited in independent claims 3 and 22 and their dependent claims 15 and 36. Furthermore, the combined teaching of Kuamle et al. and Tsuge et al. does not disclose using a single sintered target containing 20%-50% by weight of titanium and 80%-50% by weight of aluminum in a nitrogen-free vacuum atmosphere, as recited in independent claim 22. Accordingly, Applicants respectfully submit that the §103 rejection of claims 15 and 36 is overcome.

Claims 16 and 37 were rejected under 35 U.S.C. § 103(a) over Kuamle et al. further in view of Dietz et al., U.S. Patent No. 5,264,032. Applicants traverse the rejection because the combined teaching of Kuamle et al. and Dietz et al. fails to disclose or suggest all of the features recited in the claims.

Claims 16 and 37 depend from independent claims 3 and 22, respectively. As explained above with respect to independent claims 3 and 22, Kuamle et al. fails to disclose or suggest a thin metal film or method of manufacturing a thin metal film made from a titanium-aluminum alloy containing 20-50% by weight of titanium and 80-50% by weight of aluminum, the thin metal film having a homogenous composition throughout a whole thickness of the thin metal film and having a color similar to pure chrome. Dietz et al. fails to

remedy the deficiencies of Kuamle et al. because Dietz et al. is merely directed to pigment preparation in non-metal compositions, and is not directed to metal alloys.

Therefore, Applicants submit that the combined teaching of Kuamle et al. and Dietz et al. fails to disclose or suggest a thin metal film or method of manufacturing a thin metal film made from a titanium-aluminum alloy containing 20-50% by weight of titanium and 80-50% by weight of aluminum, the thin metal film having a homogenous composition throughout a whole thickness of the thin metal film and having a color similar to pure chrome, as recited in independent claims 3 and 22 and their dependent claims 16 and 37. Furthermore, the combined teaching of Kuamle et al. and Dietz et al. does not disclose using a single sintered target containing 20%-50% by weight of titanium and 80%-50% by weight of aluminum in a nitrogen-free vacuum atmosphere, as recited in independent claim 22. Accordingly, Applicants respectfully submit that the §103 rejection of claims 16 and 37 is overcome.

Claims 17 and 38 were rejected under 35 U.S.C. § 103(a) over Kuamle et al. further in view of Hirai et al., U.S. Patent No. 4,367,307. Applicants traverse the rejection because the combined teaching of Kuamle et al. and Hirai et al. fails to disclose or suggest all of the features recited in the claims.

Claims 17 and 38 depend from independent claims 3 and 22, respectively. As explained above with respect to independent claims 3 and 22, Kuamle et al. fails to disclose or suggest a thin metal film or method of manufacturing a thin metal film made from a titanium-aluminum alloy containing 20-50% by weight of titanium and 80-50% by weight of aluminum, the thin metal film having a homogenous composition throughout a whole thickness of the thin metal film and having a color similar to pure chrome. Hirai et al. fails to remedy the deficiencies of Kuamle et al. because Hirai et al. is merely directed to a polyurethane composition suitable for use as a component of artificial leather or as a coating for fabrics, and is not directed to metal alloys.

Therefore, Applicants submit that the combined teaching of Kuamle et al. and Hirai et al. does not disclose or suggest a thin metal film or method of manufacturing a thin metal film made from a titanium-aluminum alloy containing 20-50% by weight of titanium and 80-50% by weight of aluminum, the thin metal film having a homogenous composition throughout a whole thickness of the thin metal film and having a color similar to pure chrome, as recited in independent claims 3 and 22 and their dependent claims 17 and 38. Furthermore, the combined teaching of Kuamle et al. and Hirai et al. does not disclose using a single sintered target containing 20%-50% by weight of titanium and 80%-50% by weight of aluminum in a


nitrogen-free vacuum atmosphere, as recited in independent claim 22. Accordingly, Applicants respectfully submit that the §103 rejection of claims 17 and 38 is overcome.

In view of the foregoing, the claims are now believed to be in form for allowance, and such action is hereby solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, please contact the undersigned at the telephone number listed below.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

Respectfully submitted,  
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